

Hybrid Solar Inverter TP1501

User Manual

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

To reduce the risk of electrical shock and to ensure safe installation and operation of Hybrid Solar Inverter, please carefully read and strictly follow all safety instructions and cautionary markings.

CAUTION — Risk of Electric Shock – Plates are live. Disconnect before servicing.

CAUTION — Risk of Electric Shock , Do NOT Remove Cover. No User Serviceable Parts Inside. Refer Servicing To Qualified Service Personnel.

WARNING — For Continued Protection Against Risk Of Fire, Connect the Grid INPUT(2 black wires) with 20A circuit breaker or fuse.

CAUTION — To reduce the risk of electric shock and fire – Do not connect the Hybrid OUTPUT(2 red wires) to ground.

CAUTION — Be sure the polarity of PV wires. The RED wire is connected to the positive polarity of the PV string. The BLACK wire is connected to the negative polarity of the PV string. The mistake may cause the damage or fire.

CAUTION — To reduce the risk of electrical shock, disconnect both AC and DC power from the Hybrid Inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter.

Turning off controls will not reduce this risk. Internal capacitors remain charged for 5 minutes after disconnecting all sources of power.

WARNING — All electrical installation shall be done in accordance with local and national codes ANSI/NFPA 70.

WARNING — Connecting this unit to the electrical grid shall only be performed by qualified personnel and only after formal approval from the utility company.

WARNING — This device contains no user serviceable parts inside. Please return the unit to authorized Service Center for maintenance.

CAUTION — This unit should be mounted on firm background and under a shading roof to avoid exposure to direct sunlight and rain.

CAUTION — Rear heat sink of this unit may exceed 80 °C (175° F). Don't touch to avoid risk of burning.

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1. Introduction

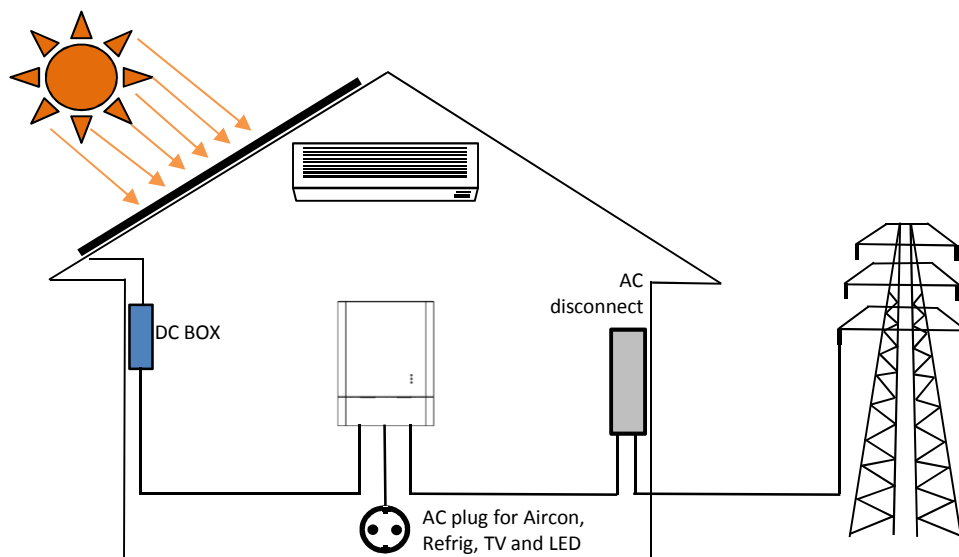
The system is a Hybrid photovoltaic inverter. The 2 hybrid sources are Photovoltaic(PV) & Grid power. There is no expensive and bulky batteries required. Hence, eliminating large expenses on battery maintenance. It can convert Photovoltaic DC energy via solar panel modules and invert collected energy into alternate current(AC), which then output to the certain home appliances that are proudly powered by solar, renewable energy. Once the PV energy is not good enough for the appliances, the Grid power will support the rest of the energy automatically.

In case of the electric blackout, the Grid power is no longer supporting the rest energy once the PV energy become weak. The power support to the home appliances need to be reduced dependent on the # of the PV panel installed & the sun condition. Unplug some appliances to keep some important ones in this condition.

This is not a Grid-tied PV inverter. There is no risk of the PV energy fed into the grid power. Hence, it is sure the TP1501 make the PV panels on the rooftop energize the home appliances under the roof possible with safety & the lowest cost.

The TP1501 can operate for 110Vac, 50/60Hz, 220Vac, 50/60Hz, It can automatically synchronize the voltage & frequency of Grid Power.

The TP1501 Hybrid PV inverter system can be monitored remotely via software. It provides users with convenient power monitoring and recording functions without the need of additional monitoring systems.



*** The traditional Air Conditioner without Inverter inside is not recommended as the Load**

2. Installation



Warning : All electrical installation shall be done in accordance with local codes and national codes ANSI/NFPA 70.



Warning : Connecting the TP1501 to the electrical grid shall only be performed by qualified personnel and only after formal approval from the utility company.

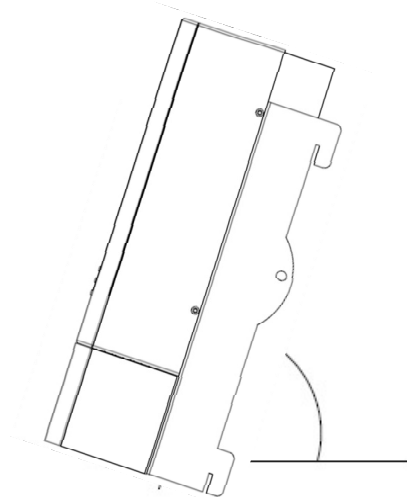
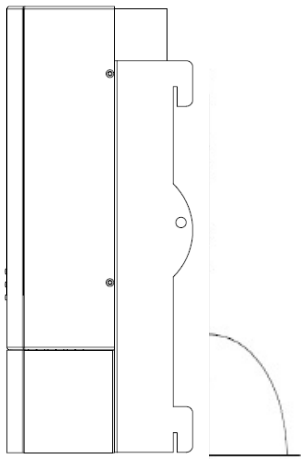
TP1501 can be installed indoor where sufficient air circulation is available with ambient temperature less than 50°C.

Outdoor installation should be under controlled environment where no direct sunlight would reach, as excessive heating would damage internal components and should minimize exposure to rain despite her high protection class NEMA 3R.

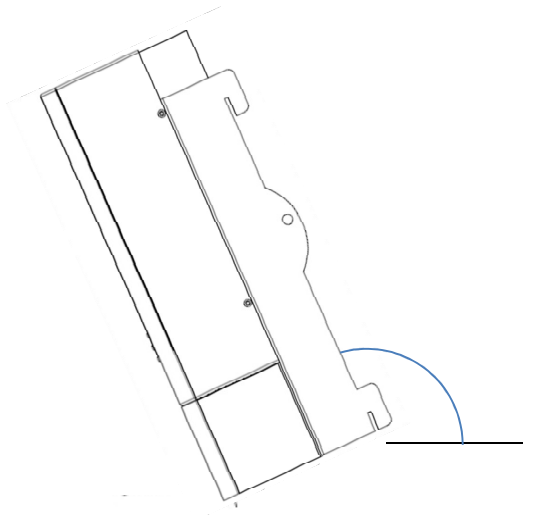
The unit should be installed in a location normally inaccessible to persons.

Please install this unit at eye-height (over 1 meter), so that all information and status from LED can be read easily.

Mount only on firm background and with correct position as below :



mount straight or tilted to the back



never mount tilted to front

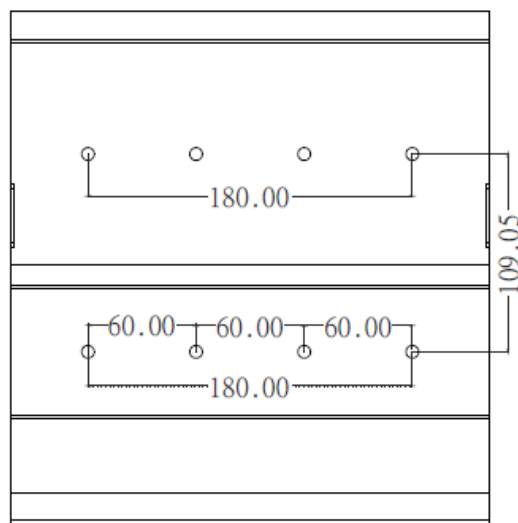
Mounting of TP1501

Place the metal fixing plate on the designated surface of the wall and mark the holes of the screw.

Drill the holes and hammer in the wall anchors.

Place the metal fixing plate again and fasten the eight screws into their respective holes.

Metal fixing



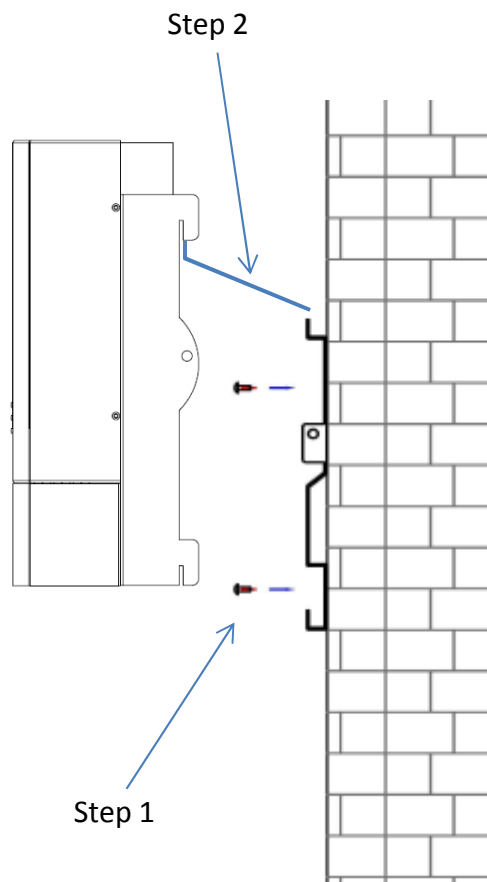
Metal fixing plate

Mount the unit on the fixing plate. Be sure that the four hooks get into their respective fixtures and settle down

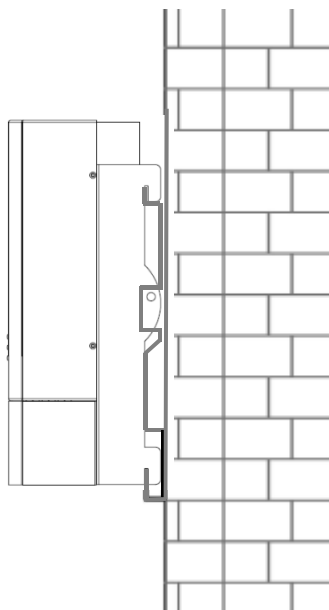
Placement of TP1501

Step1 : The screws will bracket fixed to the wall.

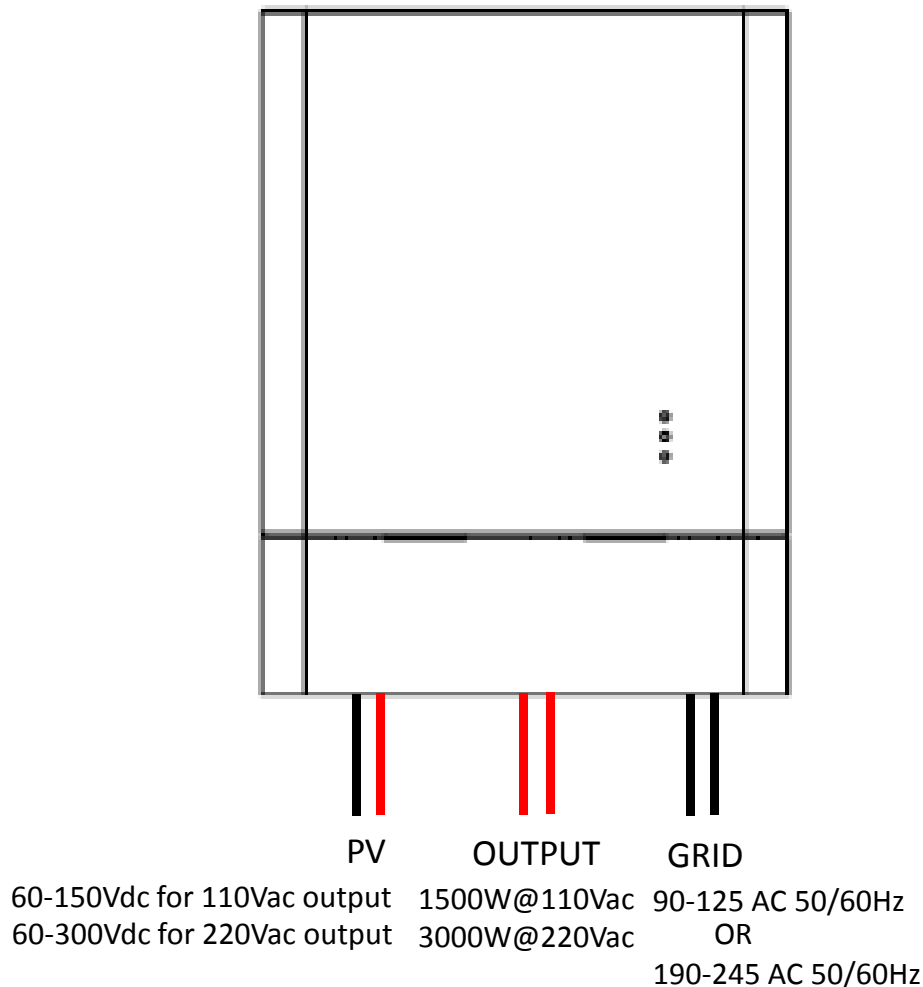
Step2 : The TP1501 are installed on the bracket.



Step3 : The TP1501 is fixed on the wall



3. Wiring process



WARNING —Follow local electrical codes and the National Electrical Code (NEC), ANSI/NFPA 70. Use copper conductors only with minimum 12AWG , 105°C , 600V wire for power grid and minimum 12AWG , 105°C , 600V wire for solar panel connections with the PV-Inverter.

Power cable selection:

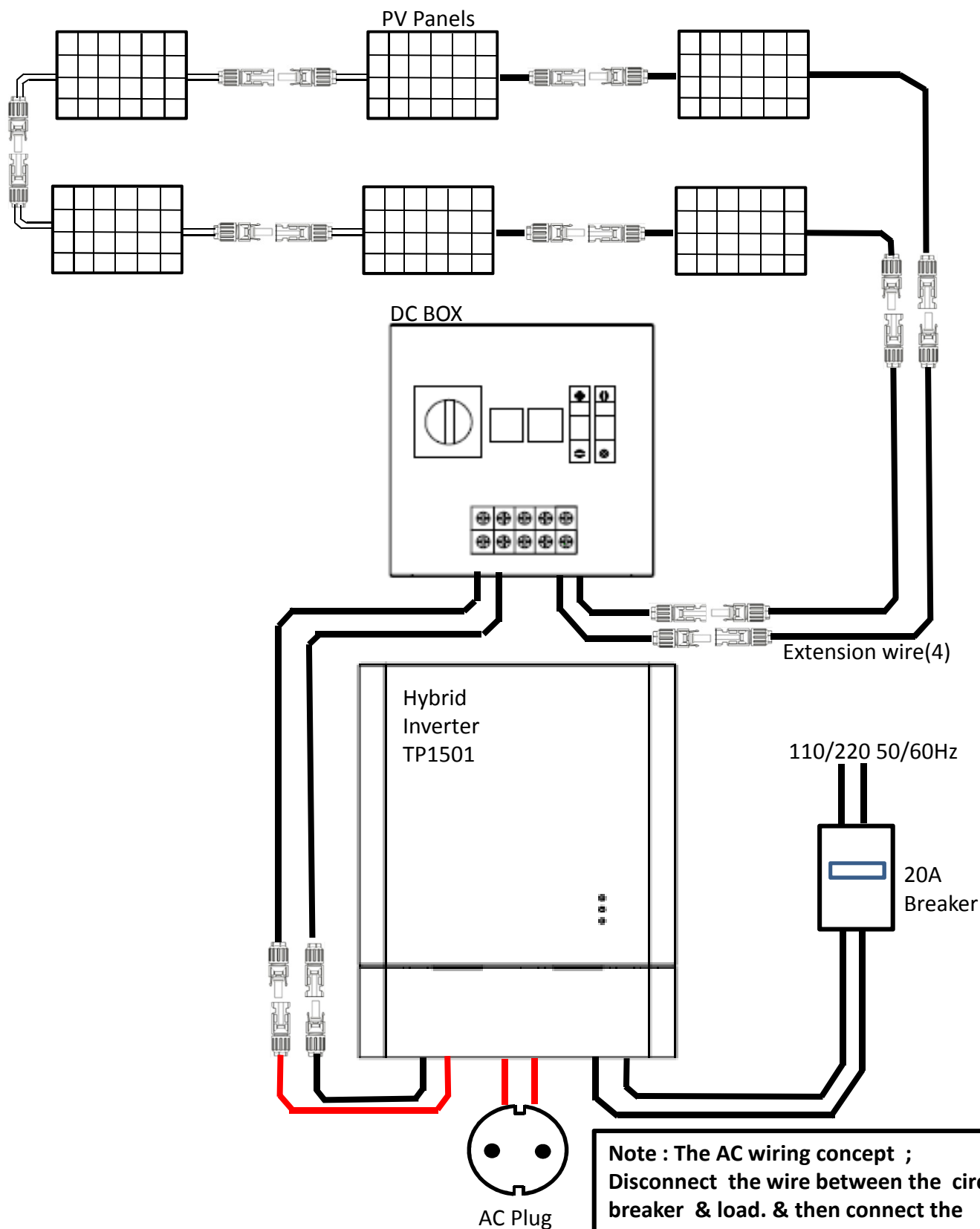
AC wire: Black copper wires of 12 AWG or above should be used for alternate current input.

Output wire: Red copper wires of 12 AWG or above should be used for alternate current output.

DC wire: For PV input from solar panels, the cross section area is dependent on the length of the wire. Identifiable colored copper wires of 11 AWG(section size 4.0mm²) or above. Connect the most positive point from the panels to the red wire of the PV input of TP1501 & the most negative point to the black wire of the PV input of TP1501. NEC 2008 / UL 4703 approval PV wire is recommended.

Turn on procedure : Apply the grid power first & then after the green LED active, apply the PV power. & then turn on the appliances
Turn off procedure : Turn off the appliances. Remove the PV power & then remove the grid power.

Recommended wiring Diagram

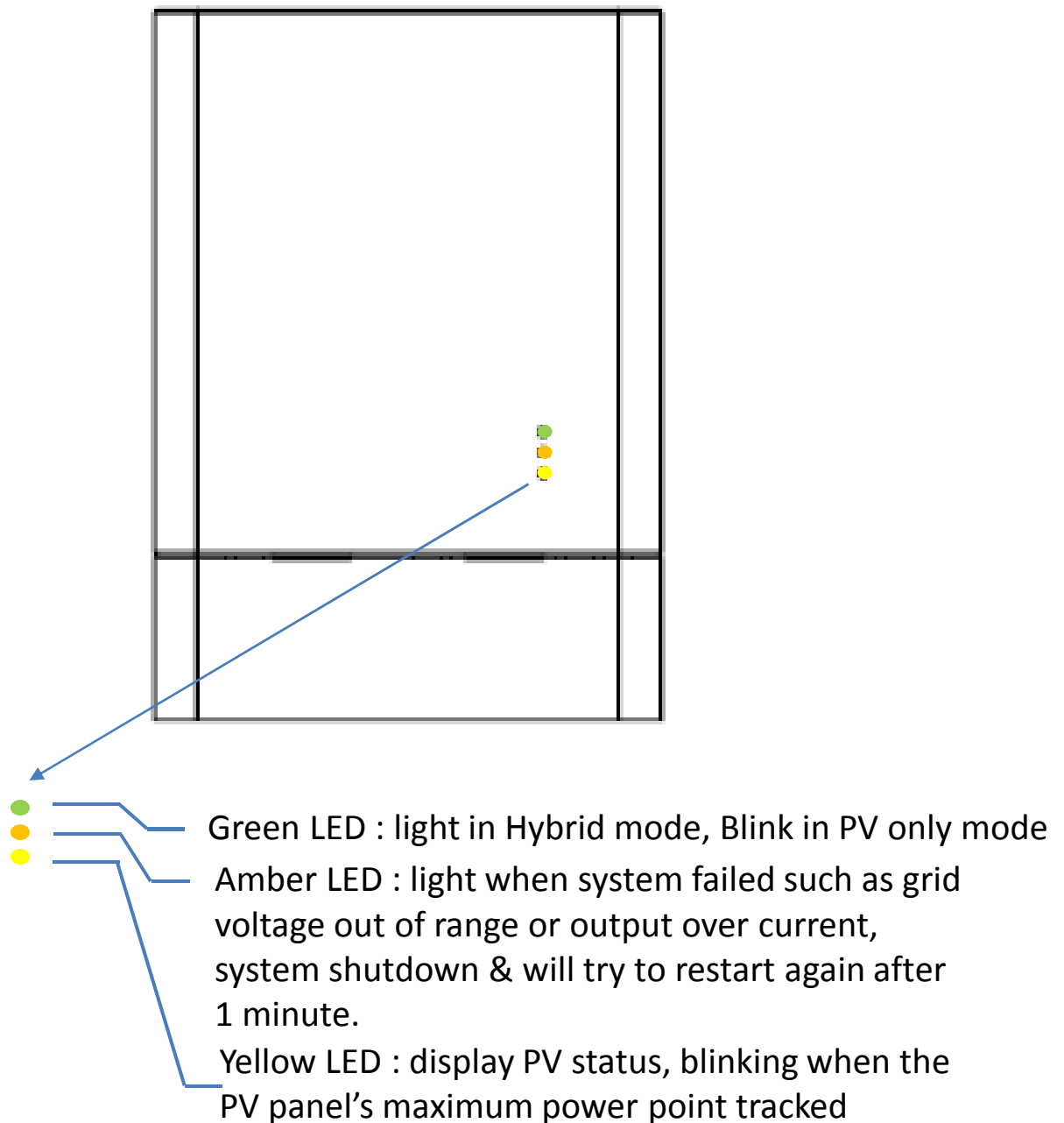


Note : The AC wiring concept ;
Disconnect the wire between the circuit breaker & load. & then connect the circuit breaker to the Grid input of the TP1501 & connect the load to the output of TP1501

5. Specifications

items	unit	Specification	Remark
Input			
PV voltage	V	60-150V@Grid =110V	
		60-300V@Grid =220V	
Charge current	A	0~15	
Maximum PV Power	W	3000	
MPPT		Yes	
Grid Voltage	V	90~125Vac@Grid=110V	Auto detected
		190~245Vac@Grid=220V	Auto detected
Grid Current	A	0~12	
Output			
Maximum Power	W	3000	
Output Volatge	V	110/220	according to the Grid voltage in normal mode
Output Current	A	0~13.5	
Output waveform		Pure sine wave	
Ouput frequency	Hz	50/60	according to the local frequency in normal mode
Work in PV only mode		Yes	Voltage & Frequency is programmable in software
Protection			
Maximum Grid Voltage	V	250	shutdown & recovery after the fault resolved
Minimum Grid Voltage	V	80	shutdown & recovery after the fault resolved
Maximum Output current	A	15	shutdown & recovery after the fault resolved
Control portion			
Communication port		RS485 or Bluetooth	
System			
Standby power consumption	W	20	
Environment			
Water Proof		IP42	
Operation temperature	C	-20~85	
storage temperature	C	-40-125	
altitude	M	0-3000	
humidity	%	0-100	
Compliance		TBD	
Standard EMC		TBD	
Mechanical			
W*D*H(mm)	mm	340*260*150	
Weight	Kg	9	

6. LEDs indication



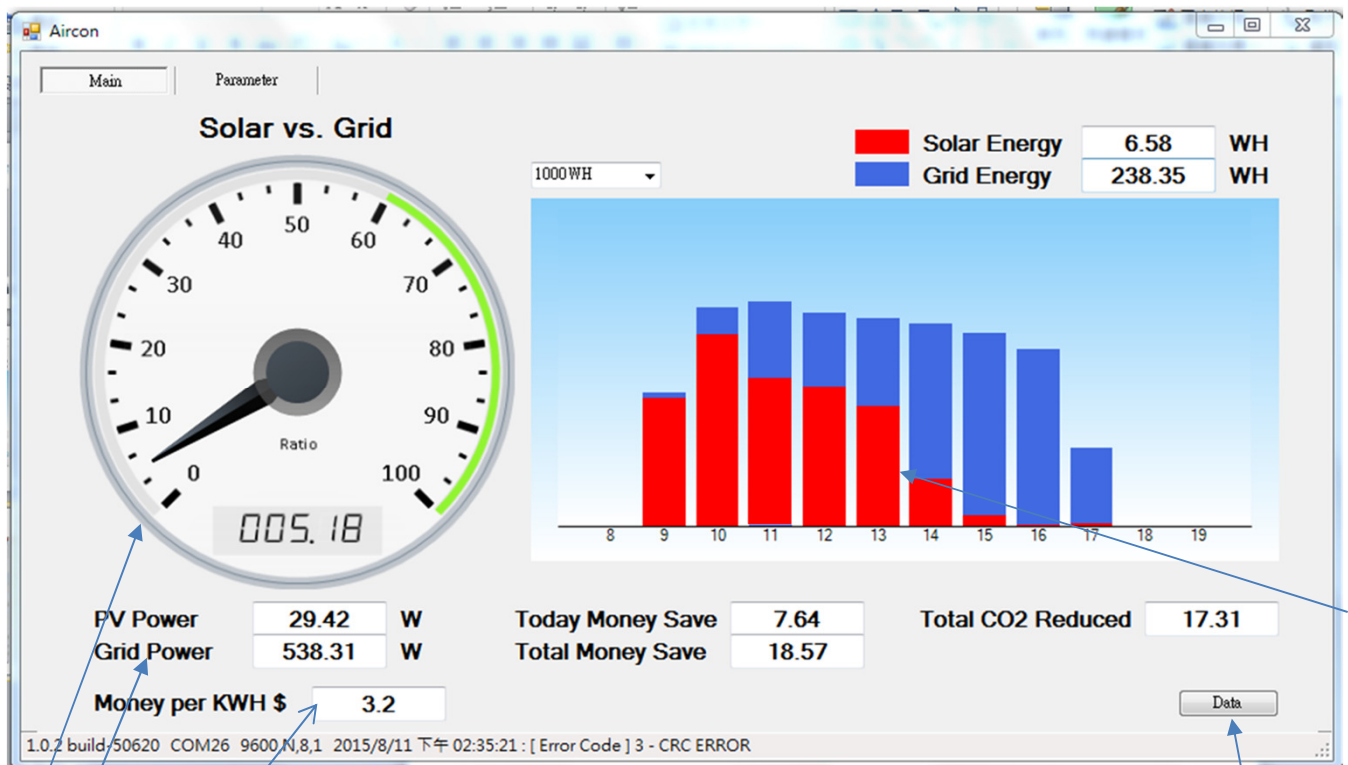
Status	Green	Amber	Yellow	OUTPUT
Day time	Light		blink	yes
Night time	Light			yes
Day time without grid	blink	light	blink	yes
Night time without grid				no
Volatge out of range	Green	light		no
Output Over load	Green	light		no

7. Monitoring system

There are 2 monitor system for TP1501, one run on Microsoft Windows, XP or above version for Personal Computer(PC) , the other run on Android for smart phone.

The display of the PC is as below :

A. Main Page



1. Solar vs. Grid ratio: display the percentage of the power from solar & grid for supplying load
2. Display the real-time power of the solar & grid supply to the load by wattage(W)
3. The local electricity cost \$/KWH, User can change this value by double clicking it.
4. Link the history data to Microsoft Excel or Open Office Excel. Double click the button to enable it.
5. Energy(WH) of solar vs. Grid by hour. Updated everyday.

B. Parameter Page

The screenshot shows the 'Aircon' software interface with the 'Parameter' tab selected. It is divided into three main sections: 'Current Status', 'Config Register', and 'Passcode'.

Current Status	
Vin	224.00
Iin	0.87
Vgrid	95.00
Igrid	3.35
IOUT	4.36
VAC	49.00

Config Register	
DEVICE ID	1
IOUT MAX	4800
VAC REF	1850
B SOFT TIME	6
BKP	9
BKI	11
B SINE RATE	97
NVARY	1
NDUTY MAX	60
110V L	1100
110V H	1500
220V L	1800
220V H	2200

Passcode	
VIN MIN	676
DELAY	10

At the bottom of the 'Passcode' section, there is a dropdown menu currently set to '110V 60Hz'. A blue arrow points from this dropdown menu to the explanatory text below.

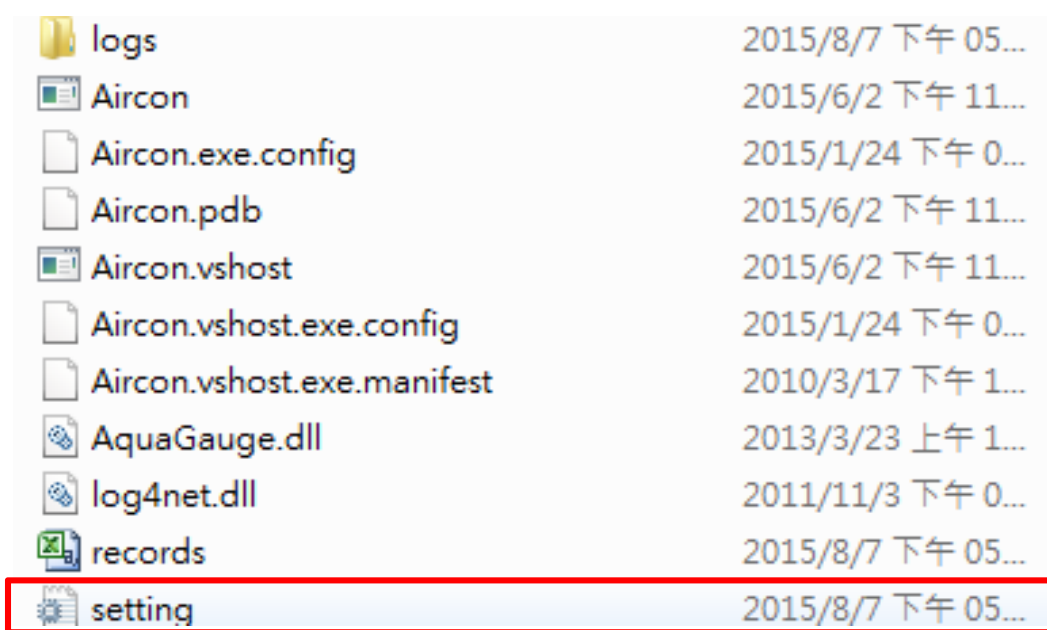
1.0.2 build-50620 COM26 9600,N,8,1 The com port open success.

In this page, user can setup the voltage & frequency during the grid power is blackout (PV only mode), there are 5 options : no output, 110V 50Hz, 110V 60Hz, 220V 50Hz, 220V60Hz

Check the local dealer, if you want to change it.

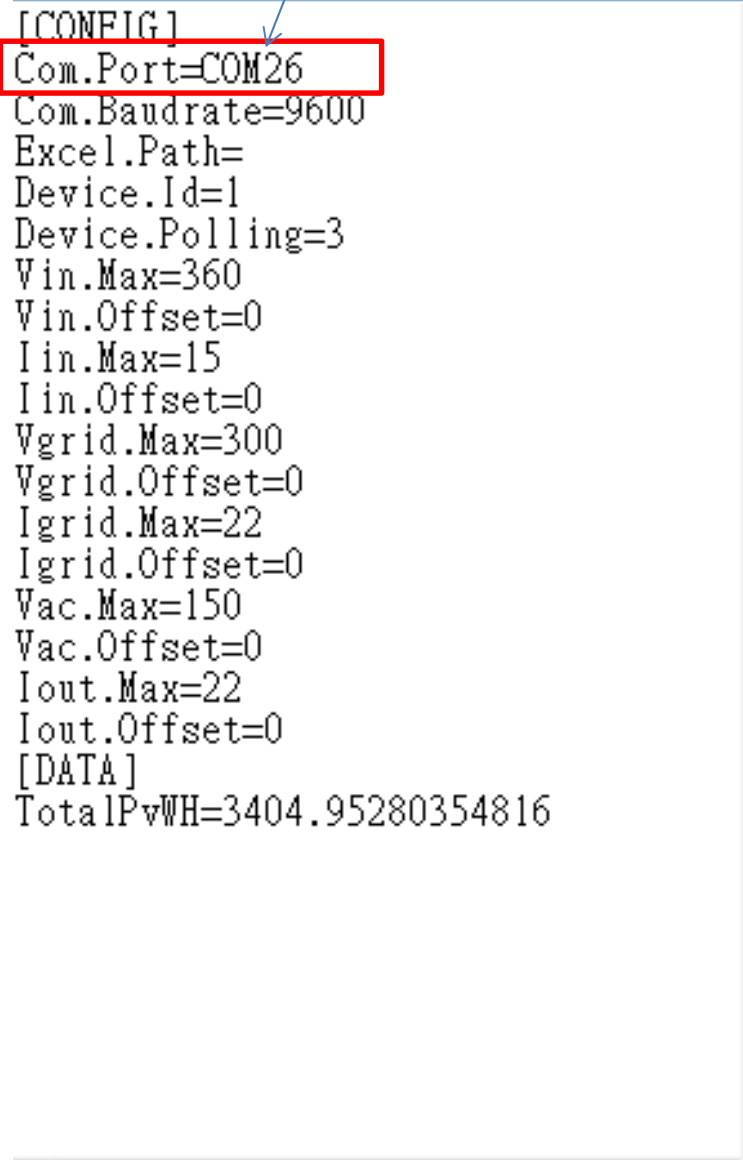
C. How to enable the Bluetooth communication

1. Click the right button while point to the Bluetooth icon in your PC.
2. Select the Add device option.
3. Computer will find the new Bluetooth device named HC-06
4. Pair HC06 with your computer by code 1234
5. After the Bluetooth successfully installed. Right click the HC-06 & then select the property & select the "Hardware" to find which COM port that linked with HC-06. For example COM10 or COM 27.



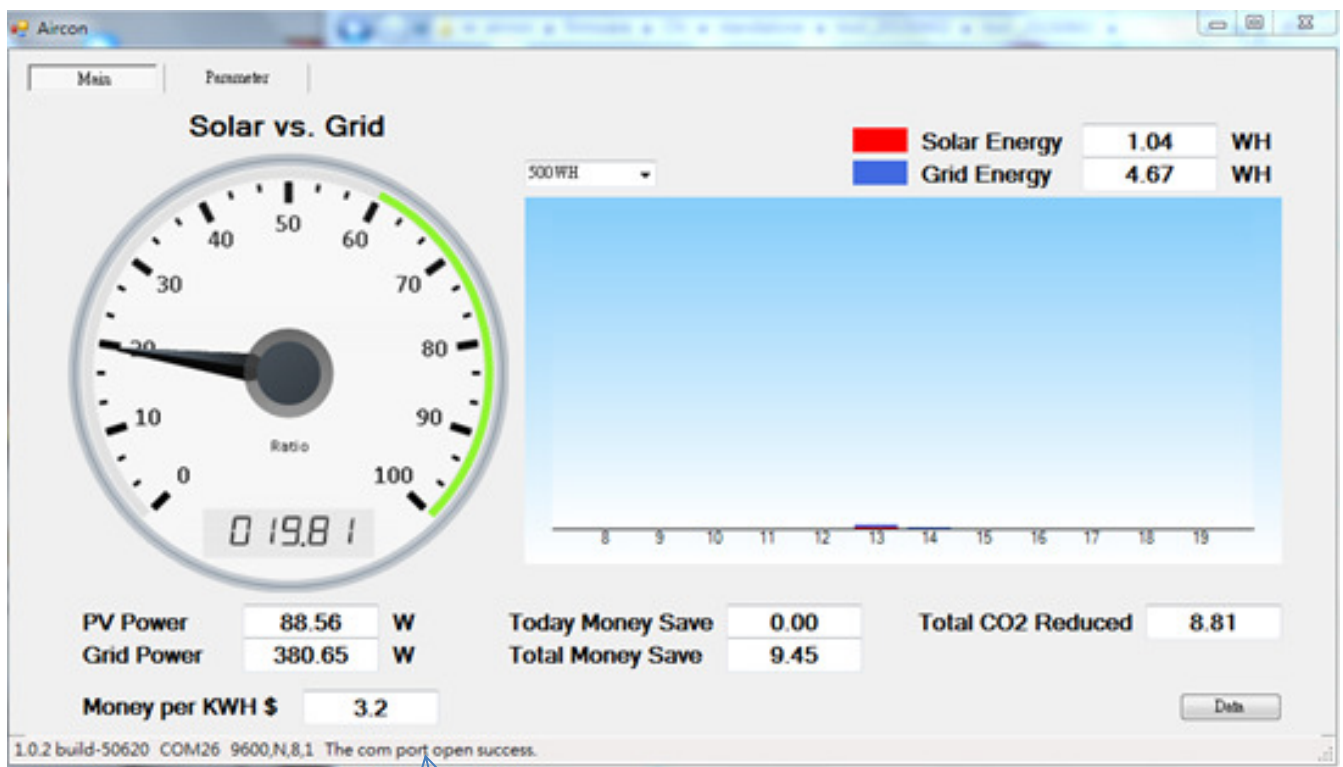
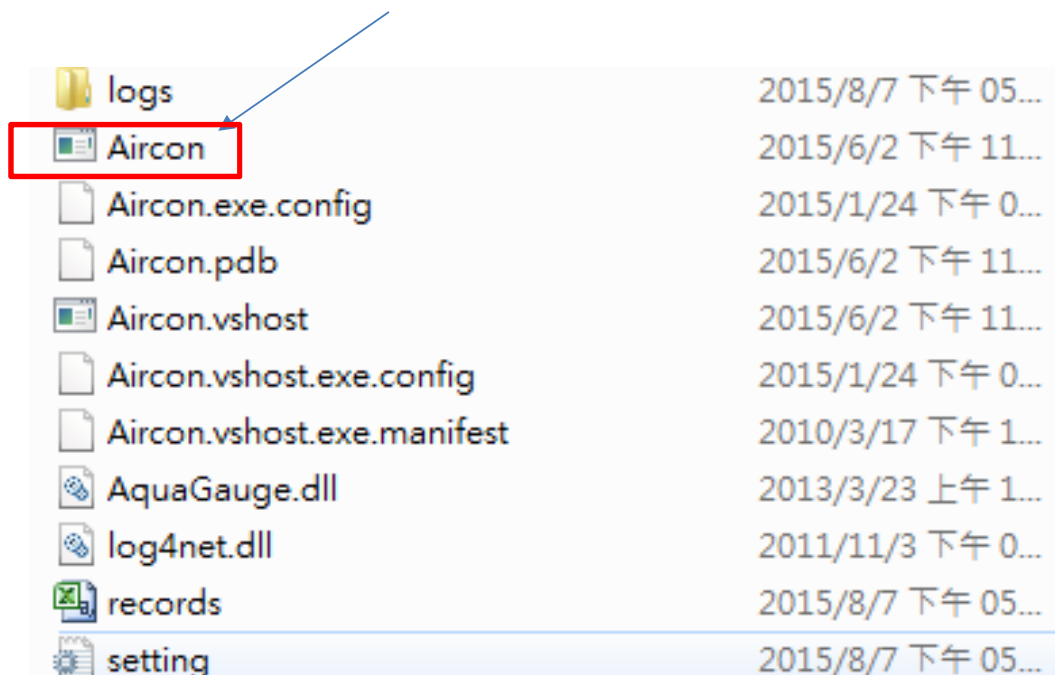
6. Open the setting.INI file of the Monitoring fold in the CD enclosed with the TP1501 package

7. Replace the COM26 by the COM port that linked with Bluetooth, & then save the file



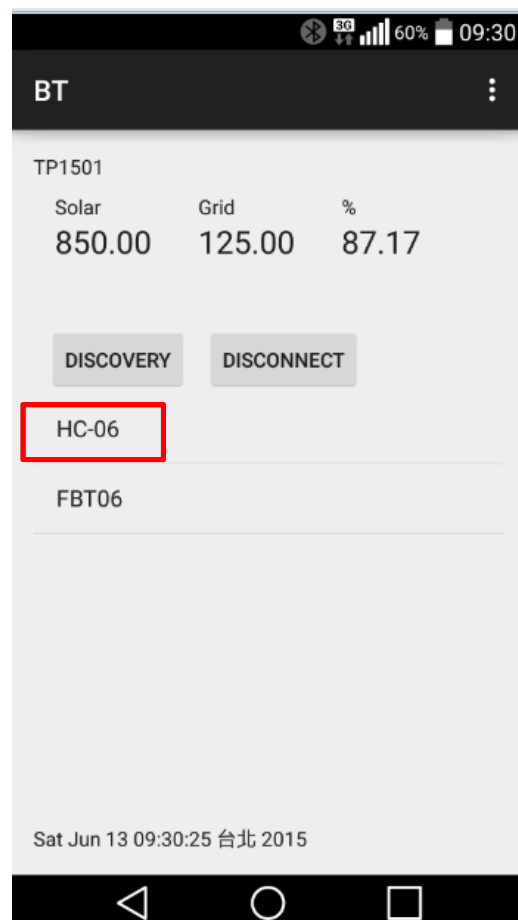
```
[CONFIG]
Com.Port=COM26
Com.Baudrate=9600
Excel.Path=
Device.Id=1
Device.Polling=3
Vin.Max=360
Vin.Offset=0
Iin.Max=15
Iin.Offset=0
Vgrid.Max=300
Vgrid.Offset=0
Igrid.Max=22
Igrid.Offset=0
Vac.Max=150
Vac.Offset=0
Iout.Max=22
Iout.Offset=0
[DATA]
TotalPvWH=3404.95280354816
```

8. Double click the Aircon.COM to enable the Display program



9. There will be "The com port open success" shown on the bottom line

The Display on Android



How to enable APP?

1. Setup your smart phone to find Bluetooth device, name HC-06 & then pair it by code 1234
2. Install the APP program, *.apk in your CD.
3. Enabling the APP named BT, the above screen will appear.
4. Click Discovery & then you will find HC-06.
5. Click the HC-06
6. The information shows solar power, grid power & the ration of Solar vs. grid.

Trouble shooting :

1. No LED active & no output

It may take about 30 seconds for the system initialized every time when the grid power first applied. After that, the green LED will be active. If the green LED doesn't light. Check the connection of the grid power.

2. No output & the middle amber LED active :

a. Disconnect the output load to check if the amber LED off after one minute.

b. Check if the input voltage is not in the range 90V~125V, 190V~242V.

3. Solar doesn't generate power(yellow LED not active in the day time):

In the day time, if the bottom yellow LED blinking, which means the solar is generating the power. If the yellow LED is not active in the day time, please check the connection of the PV panels.